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NEW MICROLEPIDOPTERA WITH NOTES*

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EUCOSMIDAE

OLETHREUTINAE

Exartema merrickanum Kft.

For some time it has appeared to me that two species have been going under the above name. Heinrich in his revision gives the food-plant as *Hamamelis* but the few bred specimens in our collection from southern Ontario from larvae on this plant together with several captured specimens from New York State did not match Kearfott's description particularly well. On the other hand we had a good bred series from larvae on *Ostrya*, taken in the Ottawa region; these specimens not only fitted the description better but in male genitalia matched excellently well with Heinrich's figure, based on a paratype. Recently it was possible for my assistant, Mr. T. N. Freeman, to make careful comparisons with Kearfott's type in the American Museum of Natural History, New York. He found that it was, without doubt, the *Ostrya*-feeder and not the *Hamamelis*-feeder that was the true *merrickanum*.

As in all the Exartemas there is considerable variation in the distinctness of the maculation; in some specimens the bands and spots are suffused with olivaceous green, much as in the considerably smaller *corylanum* Fern.; in others the spots along the inner margin, notably the pretornal triangular patch, are well-defined. In all specimens the oblique dark subapical bar is distinct and between it and the apex of the wing is a rosy suffusion which extends over the fringes; this suffusion (except in rare cases where the whole wing is tinged with rosy) does not extend *below the bar* to the tornus. Heinrich's figure of the male genitalia is very good and shows the characteristic grouping of spines of Spc. 1; this consists of a strong distal cluster extended backward by a single row of spines along the margin of the sacculus-arch to a point considerably beyond the inception of the digitus. His female figure is less good; the raised mound directly caudad of the ostium, with its irregular edges and transverse wrinkling, is not sufficiently clearly delineated.

For the *Hamamelis*-feeder we offer the following name and description:

Exartema hamameliana n. sp.

Very similar to *merrickanum* Kft. in size, color and maculation. Differs principally in the fact that the terminal rosy suffusion—which is of a slightly brighter and ruddier shade—extends through the *whole terminal area* of primaries from apex to tornus. The pretornal triangular patch on inner margin is *more prominent*, being suffused with ruddy scaling over a dark base. In the male genitalia Spc. 1 is not differentiated into an apical cluster and a backward extension but consists of a single elongate group of spines, reaching backward merely to a level with the digitus, this being due to the fact that the digitus is closer to the base of the sacculus-arch than in *merrickanum*. In the female genitalia the raised mound caudad of the ostium is much smaller than in *merrickanum* but the lateral, knob-like projections seem somewhat larger.

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Holotype– ♂, Tuxedo, N. Y., June 27, 1928 (Station Study Insects); No. 5472 in the Canadian National Collection, Ottawa.

Allotype– ♀, St. David's, Ont., June 10, 1933 (W. L. Putman) (bred from *Hamamelis virginiana*).

Paratypes–3 ♂, same data as Holotype, June 26, 28; 1 ♂, Protection, N. Y., June 16 (W. Wild); 1 ♀, Aurora, N. Y., June 26 (W. Wild); 1 ♀, same data as Allotype, June 30, 1938.

EUCOSMINAE

Eucosma louisana n. sp.

Similar to *lolana* Kft. in size, coloration and general maculation but very different in male genitalic characters.

Male. Palpi, head and thorax deep brown. Antennae feebly serrate as in *lolana*. Primaries with the costal fold extending to barely ¼; the basal area and a broad oblique, irregular median band, as well as suffusion in the terminal area, deep brown. At middle of inner margin a large, whitish, quadrate patch (in holotype faintly tinged with pinkish) extending upward to cubital vein where it is somewhat irregularly narrowed; this patch differs from that of *lolana* in having its inner and outer edges slightly *outwardly oblique* and not incurved, and is also not continued to costa; it is broader than the white patch in *lolana* and shows traces of brown striae through its median area. The dark basal patch shows traces of black sprinkling over its inner area and is connected along costa with the median band by a leaden brown area. Median band much as in *lolana* but slightly narrower; it contains some blackish sprinkling above inner margin which tends to form a dark spot above tornus and a certain amount of leaden suffusion. Beyond the median band the white suffusion is not as heavy as in *lolana* and in consequence the 4 dark costal spots are not as distinct; there is considerable leaden suffusion in this area, mingled with some light brown striae, especially below apex. The ocellus is indistinct, being represented by two broken black striae with some black sprinkling costad of same. Traces of white dots anterior to outer margin. Fringes leaden, deepening toward apex. Secondaries deep smoky with scarcely paler fringes. Beneath smoky, the preapical costal spots of primaries relieved by pale ochreous shading and the pale terminal dots more distinct than on upper side. The genitalia are much smaller than those of *lolana*; the ventral margin of the clasper is gently sinuate and the cucullus shows 3 or 4 spines at its lower angle; the whole organ shows considerable similarity to that of *perdricana* Wlshm. as figured by Heinrich in his revision (fig. 205). Expanse 20 mm.

Holotype– ♂, Lake Louise, Alta., July 19, 1938 (7600 ft.) (G. S. Walley); No. 5473 in the Canadian National Collection, Ottawa.

Paratype– ♂, Blue Lake, B. C., Aug. 4, 1938 (7000 ft.) (J. K. Jacob).

LASPEYRESIINAE

Laspeyresia flexiloqua Heinr.

This species was based on a single female specimen from Calgary, Alta., a figure of the genitalia being given in Heinrich's revision, Pl. 23, fig. 142; the type specimen and genitalic slide are in the Canadian National Collection.

I find, on comparison of genitalic slides, that a small series of specimens from the Ottawa region which I had separated out from *populana* Bsk. on their larger size and more suffused appearance, belong under *flexiloqua*. The male genitalia are practically similar to those of *populana*, as figured by Heinrich (*op. cit.* fig. 319), and as represented among others in our collection by Aweme, Man. specimens, determined in 1924 by Heinrich on the basis of maculation and genitalia. The only differences, as far as I can see, are the larger size, the slightly more sinuate ventral edge of the claspers and the more attenuate apical portion

of the aedeagus; both species possess several minute teeth on the right side of this organ subapically. A male specimen from Nordegg, Alta., determined by Heinrich on the same occasion as *populana*, proves to be *flexiloqua*, matching our Ottawa series excellently. The Calgary holotype of *flexiloqua* is paler and more strongly and contrastingly marked than our eastern specimens and the Nordegg male, but this is probably merely individual variation.

Flexiloqua should undoubtedly be placed in our lists next to *populana* from which it differs, apart from its larger size, in the finer nature of the strigate costal markings and the greater suffusion of pale shading over the basal patch, especially along costa and inner margin; in *populana* the dark basal patch is well-defined over the whole wing-area by a strongly angulate outer edge.

PHALONIIDAE

Henricus (Commophila) brevipalpata n. sp.

Very similar in maculation to *infernalis* Heinr. (1920, Proc. U.S.N.M., LVII, 61) but at once distinguishable by the *short palpi which only jut very slightly beyond the head*, whereas in what we identify as *infernalis* they project at least 'twice the length of the head' and are slightly drooping. The ground-color of primaries is the same creamy white found in *infernalis;* the dark basal patch is essentially the same as is also the mushroom-like patch based on the inner margin beyond the middle; the costal maculation appears somewhat fainter and the subapical bar is *decidedly reduced with much less black edging* than is found in *infernalis*. The size is decidedly smaller, being 15 mm. expanse as compared with 17-19 for our specimens of *infernalis*. The male genitalia are also very similar to those of *infernalis* but the socii are shorter and less recurved and the bulbous proximal half of the aedeagus is distinctly shorter.

Holotype— ♂, Clinton, B. C., June 12, 1938 (J. K. Jacob); No. 5484 in the Canadian National Collection, Ottawa.

Paratype— ♂, same data.

A series of four specimens, which appear to agree with Heinrich's characterization of *infernalis* and which I am identifying as this species, was captured at the same place and at the same time. If it had not been for the very decided differences in palpal length I should never have looked upon the present species as distinct.

OECOPHORIDAE

Genus **Depressaria** Haw.

Breeding during this past season has revealed another undescribed species in the *betulella* group, the larva feeding on *Corylus*. Of the two species now known to feed on *Corylus* (hazel), the best-known, *grotella* Rob., is distinguished in the larval stage by its pale coloration and the fact that it ties up the terminal shoots into a *very characteristic ball* (*vide* Can. Ent., 1943, LXXV, 35). The other species forms, as larva, no ball, but lives between two loosely tied-together leaves; they are further distinguished from one another in this stage by the color of the head which in one case (*atrocapitella*) is blackish and in the other pale amber. Before proceeding to a description of the new species I should like to rectify an error that occurred in my larval notes on *D. ostryella* (*op. cit.* p. 35); I stated that the 'prothoracic shield' showed considerable dark shading, but it is the *head* and not the shield which shows this shading; in immature larvae the head is almost entirely black and the body rather shiny and whitish. A good series of the species was bred from larvae collected on *Ostrya* in late May and early June, 1943, in the Ottawa region.

Depressaria atrocapitella n. sp.

Palpi pale creamy, the brush of the second joint considerably sprinkled with smoky and the third joint broadly blackish at tip. Head and thorax creamy-white with pale grayish suffusion. Antennae with the basal joints blackish, the

remainder pale creamy with fine brown annulations. Abdomen light ochreous, suffused dorsally with gray on posterior half and with broad, blackish, lateral bands ventrally. Primaries whitish-gray with the whole middle area of wing from base to postmedian line shaded with light fawn-brown, leaving the costa rather broadly and the outer area entirely of the pale color with a few dark speckles. Maculation much as in the allies. A small black spot at the extreme base of costa, another about the middle, and three equidistant dark spots between the t. p. line and apex of wing; below these there is slight darkish shading. Radial veins partially outlined in blackish. The usual two distinct whitish spots in the cell, the basal one with black centre; below it traces of a black-margined pale spot in the fold; no connecting black streak. T. p. line improminent, marked by the contrast between the dark inner and paler outer areas. A terminal series of dark dots. Fringes concolorous. Secondaries light smoky, paler in basal area. Expanse 19 mm.

Male Genitalia. Very similar to those of *grotella.* The clasper is narrower and even more pointed; the two prongs of the harpe are closer together; at the base of the clasper, below costa, is a distinct setose papilla. The gnathos is *much more elongate and narrower* than in *grotella;* the transtilla (for what it is worth) is narrower and more flatly diamond-shaped. The aedeagus is quite similar but rather less S-shaped.

Female Genitalia. The lobes of the ovipositor are long and pointed much as in *ostryella.* The genital plate is almost as high as it is wide with the caudal margin showing a small U-shaped depression at the base of which the small, oval, slightly crinkly ostium is placed. The ductus bursae is shorter than in allied species and only shows three convolutions.

Holotype—♂, Jockvale, Ont., June 27, 1943 (J. McDunnough) (bred on *Corylus*); No. 5471 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, June 29.

Paratypes—1 ♂, 1 ♀, same data, July 4, June 29; 1 ♂, June 21, 1942 (T. N. Freeman) (all bred on *Corylus*).

The larvae, as indicated, have a black head and rather shiny, dull whitish abdomen. The pale, generally grayish look of the adult at once distinguishes it from the much deeper brown *grotella* and *ostryella.*

Martyrhilda jacobi n. sp.

Female. Palpi long, thin, upturned, whitish, with slight suffusion of dark scaling on outer side of second joint. Head white. Thorax pale ochreous mixed with white. Primaries light ochreous with very scattered dark sprinkling. In basal third of cell two obliquely placed black dots and another elongate dark mark in the fold directly below the outer and lower of the two spots. A dark, poorly defined suffusion over end of cell, containing a large black spot at the base of vein 5. Five dark spots equidistant in outer half of costa, the inner one placed directly above the above-mentioned dark suffusion. A black line, broken by the pale color to form a series of dark dashes, along outer margin. Fringes whitish. Secondaries and fringes whitish with mere traces of a dark terminal line. Expanse 20 mm.

The genitalia show most resemblance to those of *nivalis,* as figured in Gates Clarke's Revision (fig. 231) but the lobes of the genital plate are close together in the median line, the cephalic margin is strongly convex and the ostium does not extend so far caudad.

Holotype—♀, Blue Lake (7000 ft.), West of Lytton, B. C., Aug. 2, 1938 (J. K. Jacob); No. 5486 in the Canadian National Collection, Ottawa.

I dedicate the species to the collector, J. K. Jacob, whose promising entomological career was cut off in an untimely manner by tuberculosis.

CAMPOPLEGINE NOTES AND DESCRIPTIONS (HYMENOPTERA, ICHNEUMONIDAE) *

By G. STUART WALLEY,
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The following notes deal with three species in the genera *Spudastica, Echthronomas* and *Campoctonus,* and are based on material in the National Collection, supplemented by specimens loaned from the United States National Museum and the personal collection of Dr. H. K. Townes, to whom I am especially indebted for providing me with this additional material.

SPUDASTICA Foerster

Spudastica canadensis n. sp.

The present species is referred to *Spudastica* Foer., although it differs from the genotype, *S. kriechbaumeri* (Bridgm.), as described by various authors including Schmiedeknecht (Opus. Ich., IV. p, 1697, 1909), in possessing distinct propodeal carinae. In many other respects, notably the strongly angular radius, very oblique nervulus and nervellus, short, declivous propodeum, short, stout antennae, and the rather long and prominent ovipositor and sheath, it agrees with the genotype.

Apart from a record of an undescribed species referred to this genus in J. B. Smith's lists of the insects of New Jersey, there appears to be no previous indication of the occurrence of *Spudastica* in North America. Like its European congener the present species flies in early spring, which may account for its generally being overlooked by collectors. The host for *canadensis* is unknown.

Female. Length 7 mm., antennae 4 mm., sheath 2 mm. Body, especially head and thorax, clothed with rather dense, very fine, short, pale pubescence. Head transverse, as wide as thorax; temples rather evenly rounded, moderately receding; face as broad as length at middle from antennal foramen to margin of clypeus; the latter broad, with free margin truncate except at sides; margin of clypeus not impressed; clypeal foveae distinct; inner orbit with a slight but distinct emargination opposite antenna; malar space one-half basal width of mandible; ocellocular space equal to diameter of a lateral ocellus; antenna 29-segmented, short and stout, with the apical 12 to 14 segments distinctly thicker than long, discrete and involute; head opaque, finely and rather uniformly granular, the central portion of the face with very obscure, fairly dense punctures; clypeus with a few scattered inconspicuous punctures.

Pronotum with numerous fine, irregular rugulae; mesoscutum and scutellum dull, finely, evenly granular; mesopleura, except for rather large smooth speculum, metapleura and mesosternum, rather dull, and largely evenly granular, with obscure, shallow punctures on lower mesopleura; prepectoral carina distinct, complete; propodeum not produced at apex, strongly declivous, except at extreme base, median longitudinal carinae distinct, regular, gradually diverging posteriorly to point where they join the well defined lateral portions of apical transverse carina; lateral longitudinal carinae very feebly indicated and irregular; propodeal sculpture consisting for the most part of numerous, fine, short, irregular, transverse rugulae. with the basal lateral regions more granular; fore wing broad, with the wing tip rather sharply rounded, and the outer margin of the wing obliquely truncate; radial cell large, broad; areolet subpetiolate, recurrent received beyond middle; nervulus slightly postfurcal, strongly oblique; nervellus strongly inclivous, broken near its posterior extremity; inner hind calcarium slightly more than one-half as long as basitarsus; claws with only a few minute teeth at base.

Abdomen rather broad, the third segment only slightly compressed, the segments beyond gradually more strongly compressed; petiole moderately long,

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dilating rather strongly before spiracles, the postpetiole broad, with parallel sides; glymma distinct; spiracle of second tergite situated a little beyond middle of lateral margin, gastrocoeli small and poorly defined; abdominal tergites moderately shining, finely reticulately sculptured; ovipositor moderately stout, falciform.

Body black; mandibles yellow; palpi stramineous; tegulae and wing bases pale creamy yellow; all coxae black; all trochanters, femora and tibiae, and front tarsus, ferruginous, with extreme bases of tibia slightly paler; middle and hind tibial spurs pale yellowish; middle tarsus light ferruginous, with the basal segment fading to pale yellowish toward its base; hind tarsus with basal segment yellowish with brownish apex, the following segments uniformly suffused with brownish, except the second which is narrowly paler at the base; abdominal sternites yellowish, with extensive brownish suffusions, the incisures paler.

Male. Length 6.5 mm.; antenna 4.5 mm. Very similar to the female in structure and color; differing as follows: Antenna 27-segmented, the apical segments of flagellum a little longer in proportion to their thickness; hypopygium narrowly ligulate, with angularly emarginate apex; hind tibia infuscate along extensor surface, especially toward apex.

Holotype — ♀, Constance Bay (Carleton Co.), Ont., April 26, 1935 (G. S. Walley); No. 5540 in the Canadian National Collection, Ottawa, Ont.

Allotype — ♂, Old Chelsea (Hull Co.), Que., April 21, 1933 (G. S. Walley).

Paratype — ♀, Old Chelsea, Que., April 30, 1937 (G. S. Walley).

ECHTHRONOMAS Foerster

In 1924 Cushman described *Echthronomas ochreofrons* from a female specimen taken at Veitch, Virginia. Recently I have had the opportunity of studying a considerable series of *Echthronomas* material from the collections of H. K. Townes and the United States National Museum and also a short series in the Canadian National Collection. On the basis of color distinctions noted below I have been able to arrange this material in two groups, which, when analyzed from the standpoint of distribution, warrant, I believe, the recognition of two geographic races. Typical *ochreofrons* occurs in localities lying on or within the borders of the Upper and Lower Austral zones (the majority of localities noted are in the eastern coastal portion of the Upper Austral zone); whereas the second race inhabits the Transitional and Canadian zones, having in the latter zone a transcontinental distribution. There are apparently no structural differences between the two races, which, however, may be distinguished by color characteristics as follows:

Face, clypeus and frontal orbits in both sexes yellow, rarely with the frontal orbits of female narrowly interrupted above antennae ..... *ochreofrons ochreofrons* Cush.

Female with face black, and clypeus varying from largely black, with a small yellow spot on either side, to yellow except for a median dusky stripe; frontal orbits of female black, with a short yellow mark at summit of eye; face, clypeus and frontal orbits of male yellow, the orbits narrowly interrupted a short distance above antennae, occasionally with the interruption not quite complete ..... *ochreofrons lexiphaga* n. subsp.

Echthronomas ochreofrons ochreofrons Cush.

Echthronomas ochreofrons Cushman, Proc. U. S. Nat. Mus., LXIV, Art. 4, p. 12, 1924.

Cushman's comprehensive description of the structure and color of the female serves very well for the majority of the specimens I have examined, except that the frontal orbit is rarely (one out of 23 specimens) interrupted above the

antennae and the hind coxae are sometimes entirely reddish, or more usually with less black than is described for the type. In a few specimens the thorax and propodeum are more or less extensively ornamented with various paler markings which range from dull yellow to stramineous or pale reddish. Such markings are found on the anterior lateral regions of the mesoscutum, pleura, scutella and the propodeum.

The male, which has not been previously described, agrees in structure with the female except for the usual sexual differences, and it agrees in color with the female except that the entire first tergite and the second tergite except for a narrow apical portion are usually black, and the three or four apical tergites are generally largely blackish. In the female the apical tergites are only faintly stained with blackish or are entirely reddish.

Material examined: 52 ♂♂, 23 ♀♀, from N. J. (Moorestown, Tabernacle); N. Y. (Eastport, Farmingdale, Hancock, Riverhead); Md. (Plummers Isl., Takoma Pk.); Ga. (Atlanta); Kan. (Lawrence). Dates of capture range from late May to early August, the majority of the specimens having been taken in July.

Echthronomas ochreofrons lexiphaga n. subsp.

Differs from typical *ochreofrons* as noted in the above key. Considerable variation in leg color occurs in this race, the darkest females having the four posterior coxae entirely black, and their adjoining trochanters brownish-black, with the anterior coxae largely blackish, and the four anterior femora reddish. A few males have the leg color almost equally dark. These conditions apply only in some specimens from Canadian localities; others grade toward a paler leg color as found in the series from United States localities, some specimens of which approximate typical *ochreofrons*. Similarly, in the female, the color of the clypeus varies from largely black in the more northern specimens to mostly yellow in examples from the most southern localities.

As remarked above the localities in which this race has been found are those in which the fauna is predominantly Transitional or Canadian. In the region where the Upper Austral merges with the Transitional both races might be expected to occur, which appears to be the case in a series of 14 specimens taken at Hancock, N. Y., of which 3 males are typical *ochreofrons* and the remainder *lexiphaga*; also at Takoma Pk., Md., where a single male and female were taken, the male pertains to *lexiphaga* while the female is a typical *ochreofrons*.

Holotype—♀, Laniel, Que., July 21, 1940 (C. E. Atwood); No. 5541 in the Canadian National Collection, Ottawa, Ont.

Allotype—♂, Laniel, Que., July 17, 1940 (C. E. Atwood).

Paratypes—In Canadian National Collection: 2 ♂♂, Laniel, Que., Sept. 5, 1937, July 12, 1939 (C. E. Atwood); ♂, Lac Mercier, Que., Aug. 13, 1937 (G. S. Walley); ♂, Lac Ste. Marie, Que., July 1, 1941; ♂, St. Louis, Sask., Sept. 2, 1924 (N. J. Atkinson); ♀, Cut Knife, Sask., Aug. 29, 1940 (A. R. Brooks); ♀, Jesmond, B. C., Aug. 12, 1938 (J. K. Jacob).

In Henry K. Townes Collection: ♂, Takoma Pk., Md., Aug. 22, 1943 (H. and M. Townes); 9 ♂♂, 2 ♀♀, Hancock, N. Y., Aug. 3, 4, 11, 1935 (H. K. Townes); 2 ♂♂, Shokan, N.Y., July 11, 12, 1936 (H. K. Townes); ♀, Oneonta, N. Y., Aug. 24, 1935 (H. K. Townes); ♀, Westerly, R. I., Aug. 7, 1936 (M. Chapman).

In the United States National Museum: ♂, Grass Bog, McLean Res.[ervation], Sept. 3, 1924; ♀, Laniel, Que., July 31, 1939 (F. P. Ide).

Host—The holotype, allotype and one paratype (Lac Ste. Marie, Que.) were reared from larvae of *Lexis* sp. (probably *bicolor* Grt.).

Cocoon—The cocoon is formed within the larval skin of the host in much the same manner as in certain species of *Hyposoter*.

CAMPOCTONUS Viereck

Campoctonus orbitalis n. sp.

Readily distinguished from our other species of *Campoctonus* by the elaborate yellow ornamentation of body.

Female. Length 7.5 mm. Head moderately thick antero-posteriorly; temples moderately receding and rather strongly rounded; front with fine recticulate sculpture and a few minute punctures; face slightly narrowing below, more coarsely sculptured than frons, and with dense but shallow and rather irregular punctures; clypeus convex, with free margin broadly convexly arcuate, surface finely granular, punctate; malar space one-third basal width of mandible; ocellocular space slightly greater than diameter of a lateral ocellus.

Pronotum rather shining, with fine recticulate sculpture above and numerous fine longitudinal rugulae below; mesoscutum opaque, finely evenly granular, and with numerous fine punctures, well separated for the most part but somewhat confused on the middle; mesopleuron somewhat shining, finely sculptured between scattered punctures, and with numerous fine rugulae on upper portion; punctiform fovea of mesopleuron deep and conspicuous; speculum shagreened; metapleuron finely evenly roughened and punctate; scutellum with microreticulate sculpture and obscure punctures; propodeum with a broad, very shallow, median longitudinal sulcus commencing at basal carina, the latter distinct, preceded at middle by a pair of short, fine, converging, longitudinal carinae; apical transverse carina regular and distinct in lateral portions, medianly intersecting with a pair of well defined longitudinal carinae which form the sides of the petiolarea; anterior to the intersection the transverse carina is continued forward for some distance, on either side the sulcus, as a weak, irregular carina; spiracle broadly oval; surface of propodeum anterior to basal carina finely, evenly granular, sides a little more strongly roughened, and with fine irregular rugulae, the median sulcus transversely rugulose; legs, especially the hind femora, rather stout, the hind tibia and tarsus conspicuously spiny; longer calcarium of hind tibia two-thirds as long as basitarsus; stigma narrow; radial cell about two and three-fourths as long as broad; recurrent distinctly beyond middle of the small, briefly petiolate areolet; nervulus slightly postfurcal; nervellus slightly reclivous, unbroken.

Abdomen moderately compressed from base of third segment; petiolar segment slightly decurved, lateral foveae distinct; second tergite with circular gastrocoeli situate close to base; sheath of ovipositor twice as long as third tergite, very slender in basal two-thirds, apical third much broader, apex acute.

Black, with head, thorax and propodeum ornamented with yellow, and the abdomen largely reddish; face, except a brownish triangular area extending a short distance below the antennae, clypeus, malar space, entire orbits, though very narrowly posteriorly, mandibles, palpi, tegulae, large triangular spot on either side mesoscutum anteriorly, a pair of small triangular spots on middle of mesoscutum, scutella, middle of narrow anterior margin and humeral angle of pronotum, spot below anterior wing, small spot on mesopleuron immediately above middle coxa, and a similar spot directly anterior to it adjacent prepectoral carina, a larger spot on metapleuron directly above hind coxa, small spot below hind wing, sulcate region of propodeum, broadening posteriorly to include all the propodeum posterior to the apical transverse carina, yellow; legs reddish with the front and middle tibiae and tarsi somewhat paler, and the four anterior coxae and trochanters and a spot on the upper surface of the hind coxa creamy whitish, the front and middle coxae reddish to brownish black at extreme bases, and the hind coxa, except for the pale spot, and the basal segment of hind trochanter black; calcaria reddish; first tergite except apex, and second tergite except apical third and broad lateral margins beyond gastrocoeli black.

Holotype—♀, Waskesiu Lake, Sask., July 18, 1939 (A. R. Brooks); No. 5542 in the Canadian National Collection, Ottawa, Ont.

Paratypes—♀, same data as holotype; ♀, Waskesiu, Sask., June 25, 1938 (J. G. Rempel), in Collection of Henry K. Townes; ♀, Ann Arbor (Washtenaw Co.), Mich., May 30, 1937 (D. L. Cantrall), in Collection of University of Michigan.

Notes—The yellow ornamentation of body in this species is suggestive of a relationship with *Echthronomas* and this is further borne out by a number of structural features; however, I believe the majority of the characters point to a closer relation with *Campoctonus* where I have accordingly placed it.

OBSERVATIONS ON THE LIFE HISTORY OF *CUCULLIA ASTEROIDES* GN.

BY V. G. DETHIER,

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The conspicuously colored larva of *Cucullia asteroides* Gn. is commonly seen feeding on the flowers of autumn Compositae. Numerous descriptions of the color pattern of this species are recorded. To complete these, the setal arrangement and other distinguishing structural features are described below.

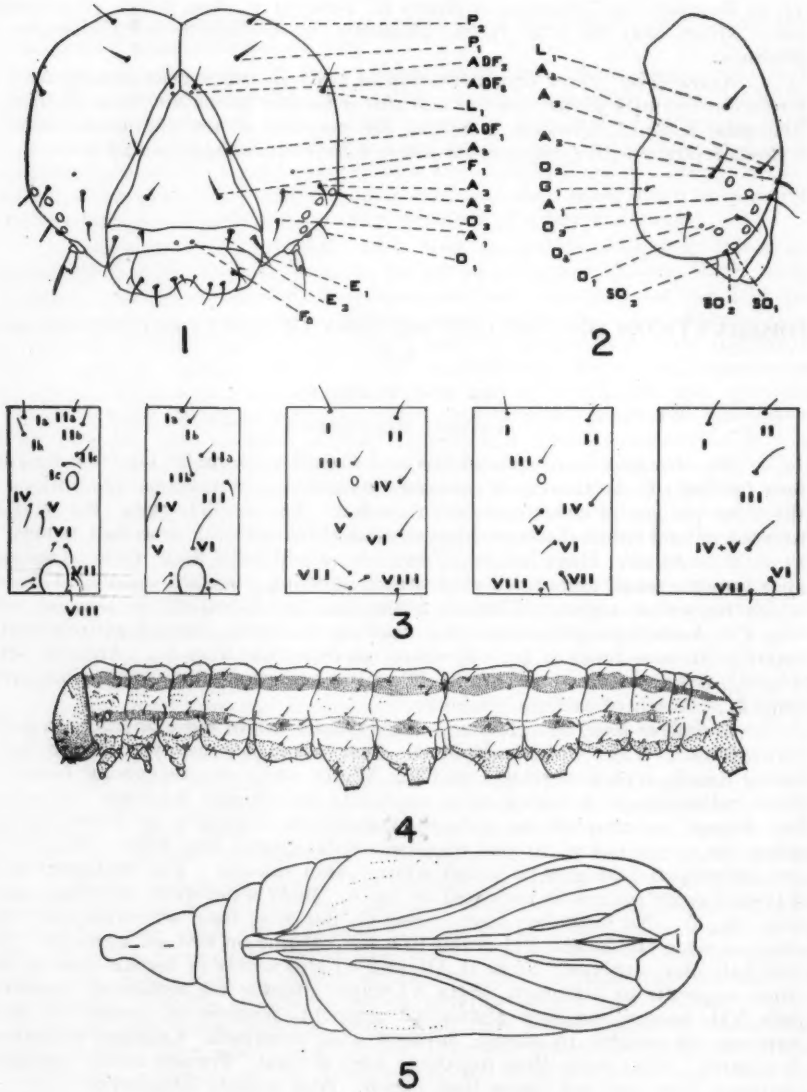
Last Instar. Head height 2.2 mm.; head width 2.6 mm. General appearance brown. Small amount of even brown mottling. Surface smooth. Greatest width in ocellar region. Clypeus triangular, approximately as long as wide (fig. 1). Second posterior setae (P_2) near top of vertex. Second adfrontal setae (ADF_2) at same level as L_1. P_1 nearer median line than L_1. Anterior setae (A_1, A_2, A_3) form an obtuse angle. No ultra posterior setae visible. Six ocelli (fig. 2). Notch of labrum moderate.

Length of body 30 to 35 mm. Body cylindrical, of more or less even width throughout. Wide white mid-dorsal line. Conspicuous even brown paradorsal line in region of setae I and II. Wider white supra-stigmatal line with faint indications of a brown stripe especially on anterior segments. Stigmatal line brown, interrupted on abdominal segments, especially in intersegmental areas. Does not extend to anal segment. Substigmatal line white. Region below subventral fold gray to soiled white. Skin smooth. The arrangement of a typical color pattern is indicated in fig. 4. Body setae short, tapering, colorless (fig. 3). No secondary hair. Setae do not arise from sclerotizations. Abdominal setae III, V, and VII nearly in a vertical line on first six segments. Seta I slightly more anterior. Setae II, IV, and VI also nearly in vertical line on first three segments of abdomen. Seta VI more anterior on remaining segments. Seta VII bisetose on first abdominal segment, trisetose on second to sixth, unisetose on seventh to ninth. Subanal setae separated. Crochets uniordinal in a band. Hind coxae close together. Legs normal. Pretarsi blunt. Spiracles circular. First and last larger than others. Also slightly ellipsoidal.

Pupa. Length 20 mm. General appearance as shown in fig. 5. No hairs. Surface smooth and shiny. No color markings. Uniformly brown.

In the fall this species frequently destroys the flowers on numerous cultivated Compositae. With the coming of the first frost it has usually completed feeding and retires to the ground where it pupates among debris and loose soil. Here it passes the winter. Pupae may be forced to complete development in the laboratory within a period of two weeks after the last larval moult.

Plate VIII.



CUCULLIA ASTEROIDES GN.

Fig. 1. Front view of the head of the mature larva of *Cucullia asteroides* Gn.
Fig. 2. Lateral view of same.
Fig. 3. Map of the body setae of *C. asteroides* Gn. The first two thoracic and the second, seventh, and ninth abdominal segments are shown.
Fig. 4. Fully grown larva of *C. asteroides* Gn., lateral view.
Fig. 5. Ventral view of the pupa of same.

NOTES ON SOME SPECIES OF COLEOPTERA TAKEN AT OJIBWAY, ESSEX COUNTY, ONTARIO†

By S. D. HICKS,
Plant Inspection Office, Windsor, Ont.

During the summer of 1943, the species of Coleoptera listed below were collected in a marshy, sandy area, five miles southwest of Windsor, Ontario. Here the predominant tree growth is oak and elm, and the undergrowth is a wide variety of herbaceous and woody plants.

Mr. W. J. Brown, Division of Entomology, Ottawa, kindly identified all specimens, except the *Oberea*, and supplied notes on recorded distribution. All other notes are by the author. Species marked with an asterisk are apparently new records for Canada.

**Macrosiagon limbatum* Fab. Two specimens were collected from the flower head of a low-growing plant.

**Zonitis bilineatus* Say. This species is rare, one other specimen having been taken at Ottawa. Five specimens were collected toward dusk in July from the flower heads of *Cirsium* sp.

**Nemognatha vittigera* Lec. One specimen was collected by sweeping.

**Agrilus atricornis* Fisher. Two specimens were taken on *Corylus americana*. Others were also observed on the leaves.

**Acmaeodera tubulus* Fab. Two specimens were taken by sweeping.

Agrilus acutipennis Mann. Several specimens were taken on the sucker leaves of oak stumps (*Quercus bicolor*).

**Typocerus sinuatus* Newm. One specimen was collected by Mr. C. J. S. Fox in July.

**Oberea oculaticollis* Say. One specimen was taken by sweeping. Identification was made by Mr. W. S. Fisher of the United States Department of Agriculture, Washington, D. C.

Oberea schaumii Lec. Two specimens were collected on *Salix* sp.

Calligrapha philadelphica L. Commonly found during May, June, and August on *Cornus stolonifera*. Although many specimens were collected, this species was never observed to breed. Adults were noticed feeding on the leaves on August 28.

**Bassareus lativittis* Germ. One specimen was taken by sweeping.

Pachybrachys othonus Say. One specimen was taken by sweeping.

Pachybrachys peccans Suffr. Several specimens were taken by sweeping.

Galerucella perplexa Fall. One specimen was taken by sweeping.

Oedionychis thyamoides Cr. This species was common on the leaves of *Eupatorium perfoliatum*, adults being observed to breed in June.

Exema canadensis Pierce. Specimens were very common on *Solidago* spp. Two males have non-typical small yellow markings on the anterior pronotal margin. Two other males from the Niagara Peninsula area have been noted to have similar markings.

Anoplitis inaequalis Web. This species is a very common leaf miner of *Celastrus scandens*, a vine abundant in this area. One, and possibly two, species of hymenopterous parasites of genus *Sympiesis*, was reared from mined leaves. Dr. O. Peck, Division of Entomology, Ottawa, determined the parasite material.

Chalepus scapularis Oliv. Several specimens were collected from the mined leaves of *Apios tuberosa* on which the adults were noticed to feed during late August and September.

**Lixus fimbriolatus* Boh. One specimen was taken by sweeping, and one on *Veronia* sp.

Conotrachelus n. sp. Many adults were observed to be chewing the tender tip buds of *Cornus stolonifera* in early June.

Rhynchaenus ephippiatus Say. One specimen was taken by sweeping.

†Contribution No. 39, Plant Protection Division, Science Service, Department of Agriculture, Ottawa.

A NEW *TANAOPS* FROM NEW MEXICO, WITH SOME NOTES ON THE GENUS (COLEOPTERA, MELYRIDAE)

BY M. Y. MARSHALL,

Wadsworth, Kansas

As a result of my description of *Tanaops testaceus* several years ago (1), a friend of mine, Mr. J. W. Green, of Easton, Penn., has sent me a good series of a species in the same genus, from New Mexico. These specimens apparently represent an undescribed species, which I would like to make known at the present time. So far as I am able to determine, no species of this genus has been heretofore reported from New Mexico.

Tanaops greeni n. sp.

Male: Oblong, parallel, the elytra slightly and gradually widened behind. Black, moderately shining, the elytral apices and sutural margin as far as the basal fourth, broad lateral and basal margins of the prothorax, anterior angles of the front, mentum, maxillae, the entire prosternum, mesosternal epimera, two anterior pairs of coxae and all the trochanters rufotestaceous. Antennae piceous, gradually becoming paler toward the base, the three basal joints rufotestaceous, with the upper margin piceous. Abdominal sclerites pale testaceous, the first segment, except the margins and median ridge, piceous, the second slightly washed with piceous. Legs piceous, except the anterior and middle femora, which are are rufotestaceous, with the upper edge piceous. Head only moderately elongate, 1.15 times as long as the width measured just behind the eyes and slightly less than three-fourths as wide as the thorax, the anterior half impunctate, the posterior half minutely punctulate and pubescent, a few erect black setae behind the eyes. Clypeal margin pale and longitudinally strigate, the palpi piceous, genae and gula glabrous, the former with transverse strigae. Antennae slightly less than one-half the length of the body, rather strongly serrate, the intermediate joints, 6, 7 and 8, sinuate on their outer edges, these joints 1 3/5 times longer than wide. Thorax quadrate, 1.2 times wider than long, all the angles broadly rounded, with a narrow lateral and basal marginal bead, continuous around the posterior angles and slightly reflexed. Disc broadly and indefinitely depressed just inside the posterior angles, shining, minutely and rather sparsely punctate, the punctures bearing fine white hairs inclined toward the front and intermixed with a few coarser black setae. Elytra minutely rugose, less shining, finely, densely and indistinctly punctate, with fine, dense, white pubescence inclined posteriorly and intermixed with much smaller number of large, black, erect hairs. The pale sutural margin somewhat widened in the middle third of the elytra; the line of demarcation between the black and yellow portions of the elytra not sharp. Lateral elytral margins narrowly explanate, the apices separately rounded. Under surface finely and densely punctured and pubescent. The anterior tarsi with the second segment slightly overlapping the third, and the fourth and fifth ventral segments bifoveate at their posterior margins, as in the other species of the genus, the foveae on the fifth segment coalescent, those on the fourth broad and poorly defined, occupying almost the entire length of the segment in its middle third. The three anterior segments carinate in the midline.

Female: Similar to the male, except in the following respects. Elytra more strongly widened behind. Thorax slightly narrowed posteriorly and slightly sinuate in front of the hind angles, the posterior impressions of the disc more pronounced. Thorax entirely rufotestaceous, with a very faint piceous cloud anteriorly. Clypeus entirely pale and membraneous. Antennae feebly serrate, shorter than in the male, reaching slightly beyond the posterior margin of the prothorax. Abdomen entirely piceous, except the center and margins of the first four segments, which are pale testaceous, the terminal segments un-

modified, the sixth or last black, produced, rounded at the apex and covered with black setae.

Length, from the anterior margin of the prothorax to the tips of the elytra, male 3.5 mm., female 3.7 mm.

Holotype, male, and allotype, female, collected by John Woodgate in the Jemez Mountains, New Mexico, July 27 (year not stated). Described from a series of 75 specimens, 23 males and 52 females. Holotype and allotype in the collection of the author, paratypes in the author's collection and in those of Mr. J. W. Green and Mr. W. J. Brown.

This species is unusually variable in coloration, especially in the relative degree of blackening of the prothorax. The specimens can be easily separated into about five groups, numbered in accordance with the progressive degree of blackening, from the entirely pale thorax, group 1, as shown in the female type, to an entirely black thorax with a minute reddish dot just inside the hind angles, group 5. A small blackish spot first appears on the anterior median aspect of the disc, group 2, then spreads to involve the anterior margin and most of the disc, leaving broad lateral and posterior pale margins, group 3, as in the male type. A further extension of this spot leaves only the posterior angles and a narrow basal margin pale, group 4. All of these variations can be found in either sex, except group 5 in the female, but when it is noted that only 12.5 per cent of the males, as against 54 per cent of the females, belong in group 1, and that 37.5 per cent of the males and 0.5 per cent of the females belong in group 4, it is obvious that the degree of darkening is strongly influenced by the sex. It seems probable that this influence will eventually result in a species in which all the males have black and all the females yellow thoraces. Some such process as this may explain the color dimorphism seen in such species as *Brachyleptura laetifica*. It also shows how unreliable color is as a means of separating species in this genus.

In the face of the variation shown by the present species, I am unable to believe that Fall's *dubitans*, which he separates from *terminalis* almost entirely on such color differences, represents a distinct species, or even variety.

In a small percentage of the specimens the narrow lateral margins of the elytra are testaceous, but this pale margin never spreads inward to approximate the similar widening of the sutural margin and thus converts the discal black vitta into a dumbell-shaped area, as in *abdominalis* and its allies.

There is also considerable variation in the amount of blackening on the abdomen. Most of the females have the abdominal segments entirely piceous, except as noted in the type, but some have this portion of the body entirely pale, except for the terminal segment and the sides of the first segment. Most of the males have the abdomen colored as in the type. In some, however, it is almost as dark as in the females, except that the terminal three segments in the male are always pale.

Fall states that *coelestinus* is the only species of the genus known to him in which the ventral pits of the male coalesce. Unfortunately, all my specimens of *coelestinus* are females, but it is noted that in the present species these pits show all degrees of coalescence and separation, in different specimens. This character is thought, therefore, not to be of specific value.

This species, *greeni*, runs to *longiceps* (or possibly *antennatus*) in Fall's 1917 key (2). It many be distinguished from the former by the dense elytral pubescence, which is its most salient characteristic, the paler thorax and less pronounced depressions near the posterior thoracic angles. *Longiceps* is also, presumably, confined to the West Coast. *Antennatus*, described from a unique specimen, also from Southern California, can be separated by the antennal characters. The intermediate antennal joints in *antennatus* are twice as long as wide, in *greeni* only 1 3/5 times longer than wide. The specimens which I have identified as *antennatus*, from the northern part of Lower California, but which

have not been compared with the type, have the 7th antennal joint exactly twice as long as wide. The pubescence on these specimens, which may represent a new species, is about intermediate in density between *longiceps* and *greeni*.

From all other described species, except *spinifer, greeni* can be separated at once by the type of elytral coloration. *Spinifer* is said to be unique in the possession of an anterior trochanteric spine in the male, which is absent in *greeni*. *Basalis,* described by W. J. Brown in 1928, has the "elytra bright yellow, each with a triangular black area which extends across the base and terminates acutely 2/5 from base near the suture." *Testaceus,* described by me in 1936, has the upper surface entirely testaceous. With these notes, it does not appear that a new key to the genus is necessary at the present time.

I take pleasure in dedicating the present species to Mr. J. W. Green, who not only donated the specimens but called my attention to the chief distinguishing characteristics of the species.

Since the above was written, I have examined specimens of *T. greeni* from La Plata Co., Colorado. This is directly north of the type locality and just across the Colorado state line, approximately 100 miles from the Jemez Mountains. The species is probably confined to the southern half of the Continental Divide.

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NEW NEARCTIC CRANE-FLIES (TIPULIDAE, DIPTERA); PART XXI.

BY CHARLES P. ALEXANDER,

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In the present report I wish to define five species of crane-flies from California, all belonging to the subgenus *Lunatipula* Edwards of the major genus *Tipula* Linnaeus. These specimens were collected by Messrs. T. H. G. Aitken, Mont Cazier, Otto Degener, Anthony Downes, and C. D. Michener, to whom I am greatly indebted for the privilege of retaining the types of the various species. In western North America, the subgenus *Lunatipula* is represented by a host of species that break up into several well-defined groups of forms.

Tipula (Lunatipula) degeneri n. sp.

General coloration of mesonotum opaque, light gray, with vague indications of more reddish gray praescutal stripes; antennae (male) with flagellar segments beyond the first black, strongly incised; wings yellowish gray, the prearcular and costal fields clearer yellow; stigma oval, pale brown; abdominal tergites polished yellow, with three brown stripes; sternites and hypopygium yellow; male hypopygium with the basistyle produced caudad into a conspicuous compressed-flattened blade, the tip acute, the lower margin fringed with long conspicuous setae; inner dististyle an elongate blade placed on the inner face of the prolongation of the basistyle, its head a compact polished black corrugated structure, the posterior portion a flattened blade, the cephalic angle further produced into a long spine; eighth sternite conspicuously fringed with long setae.

Male. Length about 18 mm.; wing 17 mm.; antenna about 5 mm.

Frontal prolongation of head polished yellow, subequal in length to remainder of head; nasus distinct; palpi brown, the terminal segment brownish black. Antennae (male) relatively long, as shown by the measurements; scape and pedicel yellow; first flagellar segment brownish yellow basally, blackened at tip, remainder of flagellum black; flagellar segments strongly incised, longer than their verticils. Head clear light gray, with black setae.

Pronotum reddish, sparsely pruinose. Mesonotum with the ground color light gray, with vague indications of more reddish gray stripes, these very poorly delimited; setae of interspaces sparse, yellow; scutal lobes brownish gray; scutellum brownish yellow, sparsely pruinose; mediotergite brownish yellow, with indications of a capillary dark brown median vitta; pleurotergite brownish yellow. Pleura chiefly obscure yellow to faintly brownish yellow, the dorsopleural region weakly darkened. Halteres with stem obscure yellow, knob dark brown. Legs with the coxae yellow, sparsely pruinose; trochanters yellow; femora obscure yellow; tibiae brownish yellow, the tips weakly darkened; tarsi black; claws (male) toothed. Wings with a strong yellowish gray tinge, the prearcular and costal fields clearer yellow; stigma oval, pale brown; centers of outer radial cells vaguely darkened; obliterative areas before cord and across cell 1*st* M_2 relatively small and inconspicuous; veins brown, more brownish yellow in the brightened portions. Venation: R_1+_2 entire; *Rs* about one-half longer than *m-cu;* R_2 unusually long, about two-thirds the outer section of R_1; petiole of cell M_1 subequal in length to the cell.

Abdominal tergites polished yellow, narrowly trivittate with brown, the extreme posterior borders of the segments pale; lateral dark tergal stripes narrow, becoming paler toward their lateral portions; sternites and hypopygium yellow. Male hypopygium with the tergite and sternite separated by a suture. Ninth tergite relatively small, its caudal margin truncate, with a quadrate median notch, the lateral lobes thus formed obliquely truncate; on lower surface of either side of tergite with a flattened lobe; groupings of setae across the caudal third of sclerite and at the outer lateral angles. Ninth sternite notched, on either side with a small cylindrical lobe that is tipped with numerous setae to form a relatively dense brush. Basistyle partially separated from the sternite by a long straight dorsal suture, the ventral suture short and poorly defined; basistyle produced caudad into a long compressed-flattened blade, its apex acute, its lower margin fringed with unusually long setae. Outer dististyle a small pale spatula. Inner dististyle of peculiar conformation, inserted at near midlength of blade of basistyle, the head an oval or conical polished black structure, with transverse corrugated blackened ridges; posterior portion of style produced directly backward into a flattened blade, the cephalic angle of which is further produced into a slender spine; outer caudal portion of blade with numerous long setae and terminating in a small point. Eighth sternite moderately sheathing; caudal margin broadly emarginate, with a conspicuous, very dense fringe of brown setae arranged in a marginal row, narrowly interrupted at the midline to form two distinct groups; inner portions of row adjoining the midline with the setae even more dense, shorter and more crinkly; extreme outer lateral angles of sternite with a further dense grouping of setae from close-set punctures; outer marginal bristles more or less distinctly separated from the remainder of the sternite by pale membrane.

Habitat. California.

Holotype. ♂, Sequoia National Park, June 8, 1942 (Otto Degener).

I am very pleased to name this fly for the collector, Dr. Otto Degener, to whom I am greatly indebted for many crane-flies from Hawaii, the Fiji Islands, and our Pacific Northwest. The fly is very different from all other American species of the subgenus. It should be noted that the structure of the blade of the basistyle of the male hypopygium, while suggesting that found in the members

of the *streptocera* group, actually is of entirely different type and the fly is not to be referred to this group of species.

Tipula (Lunatipula) micheneri n. sp.

Belongs to the *streptocera* group; general coloration yellow, the praescutum with three more reddish stripes; *Rs* nearly three times *m-cu;* male hypopygium with the tergite terminating in two large flattened lobes that are separated by a relatively narrow V-shaped notch, each lobe terminating in a small blackened point from which leads back a long carina on the ventral face of lobe; horn of basistyle relatively short, twisted, much widened on proximal half; rostrum of inner dististyle short but very slender; median brush of eighth sternite forming a compact group of at least twenty setae.

Male. Length about 15 mm.; wing 15 mm.; antenna about 4.2 mm.

Frontal prolongation of head elongate, brownish yellow; nasus distinct; palpi brownish black. Antennae with scape and pedicel yellow, the flagellum medium to dark brown; flagellar segments only gently incised. Head black, sparsely pruinose, more heavily so on front and on the very narrow orbits; anterior vertex relatively narrow, a little less than three times the diameter of scape.

Pronotum brown medially, paling to yellow on sides. Mesonotal praescutum with the ground color yellow, with three more reddish stripes that are inconspicuous against the ground; scutum yellow, the centers of the lobes more evidently infuscated; posterior sclerites of notum testaceous yellow. Pleura uniformly polished reddish yellow; dorsopleural membrane pale. Halteres with stem obscure yellow, knob brownish black. Legs with the coxae and trochanters yellow; femora yellow, the tips narrowly and very inconspicuously pale brown; tibiae and basitarsi obscure yellow or brownish yellow, the outer tarsal segments passing into black; claws (male) toothed. Wings grayish subhyaline, the prearcular and costal fields yellow; stigma pale brown; a small brown spot at origin of *Rs;* centers of cells beyond cord with distinct pale brown streaks; cells basad of cord unmarked or virtually so; veins brown, more yellowed in the brightened fields. Macrotrichia of cells sparse and scattered, virtually restricted to cells R_3 and R_4. Venation: *Rs* nearly three times *m-cu;* cell 1*st* M_2 small, narrowed outwardly, *m-cu* short, cell M_4 virtually parallel-sided.

Abdominal tergites yellow, with a slightly interrupted median black stripe and conspicuous black triangular spots near the outer anterior angle of tergites three to six, inclusive; sternites yellow; hypopygium large, chestnut-yellow. Male hypopygium with the tergal plate distinctive, terminating in two separate dorsal lobes that are separated from one another by a relatively narrow V-shaped notch; lobes large, flattened, smooth, each terminating in a small blackened point from which leads backward a long carina on ventral face of lobe; ventral tergal lobes low, transverse, separated by a small U-shaped notch, their margins truncated. Basistyle with the horn relatively short and twisted, much widened on proximal half, its tip acute. Inner dististyle with the rostrum short but very slender; dorsal crest low, entire; outer basal lobe relatively small. Outer dististyle oval, small. Eighth sternite with the lateral detached lobes unusually chitinized and compact, their oblique faces with a dense cushion of short-branched, roughened setae; median brush of sternite compact, comprised of at least a score of long straight setae that appear to be unbranched or virtually so.

Habitat. California (Riverside Co.)

Holotype. ♂, Herkey Creek, San Jacinto Mts., altitude 5,000 feet, June 19, 1940 (C. D. Michener).

This interesting species is named in honor of the collector, Dr. Charles D. Michener, to whom I am indebted for several crane-flies from California.

The fly is entirely distinct from the other described members of the group. It is perhaps closest to *mutica* Dietz, which has the structure of the hypopygium quite distinct, including the tergite, horn of basistyle, the unusually long- beaked inner dististyle, the elongate outer dististyle, and the eighth sternite. I am still uncertain as to whether all members of the group have macrotrichia in the outer cells of the wing. In some, these are reduced to one or two scattered trichia, in other species very numerous and conspicuous.

Tipula (Lunatipula) contortrix n. sp.

Belongs to the *streptocera* group; general coloration yellow, the praescutum with three black stripes that are more or less opaque by a grayish pruinosity; femora with tips narrowly blackened; wings with stigma dark brown; male hypopygium with the tergite produced into two lobes that are separated by a broad V-shaped notch, each lobe produced into an acute point; basistyle with horn long and slender, strongly twisted; inner dististyle with beak short, simple, subacute; posterior prolongation of main body of style unusually long, more or less cultriform in outline, the outer basal lobe unusually large.

Male. Length about 14 mm.; wing 15 mm.; antenna about 5 mm.

Female. Length about 13 mm.; wing 14.5 mm.

Frontal prolongation of head brownish black; nasus distinct; palpi black. Antennae (male) relatively long, as shown by the measurements; scape and pedicel light yellow; basal flagellar segments indistinctly bicolored, dark brown with the base narrowly yellow; on about the tenth and succeeding segments the color becomes uniformly dark brown; flagellar segments feebly incised, longer than the verticils. Head black, gray pruinose, more heavily so in front.

Pronotum broadly infuscated medially, paling to yellow on the sides. Mesonotal praescutum obscure polished yellow with three black stripes that are more or less opaque and obscured by a gray pruinosity, heaviest over the lateral stripes; posterior sclerites of notum yellow, each scutal lobe with two confluent black areas that are sparsely pruinose. Pleura and pleurotergite yellow. Halteres with stem obscure yellow, knob dark brown. Legs with the coxae and trochanters yellow; femora yellow, the tips narrowly but conspicuously blackened, the amount subequal on all legs; tibiae and basitarsi obscure yellow, the tips very narrowly and inconspicuously darkened; remainder of tarsi passing into brownish black. Wings with the ground color of cells basad of cord pale brownish yellow, of those beyond cord more whitish subhyaline, with conspicuous darker centers to the cells; prearcular and costal cells more yellowed; stigma unusually dark brown and correspondingly conspicuous; a small brown spot at origin of *Rs;* veins brown, more yellowed in the brightened fields. Macrotrichia of cells much reduced to virtually lacking. Venation: *Rs* more than three times the unusually short *m-cu;* cell 1*st* M_2 narrowed outwardly.

Abdominal tergites yellow, with a nearly continuous black median stripe, the posterior border of the second segment narrowly pale; tergites two to five with oval black lateral spots near cephalic portion of each segment, in female becoming more extensive on outer segments to form a darkened ring on the seventh tergite; sternites more uniformly yellow in male, the intermediate sternites conspicuously blackened in female; male hypopygium chiefly castaneous. Male hypopygium with the tergite produced into two lobes that are separated by a broad V-shaped notch; each lobe with the lateral angle narrowed to an acute point; surface of tergite with unusually few setae. Basistyle with the horn long and slender, strongly twisted. Outer dististyle long-oval. Inner dististyle with the beak relatively short but subacute, simple; dorsal crest low; posterior prolongation of main body of style unusually long, compressed-flattened, more or less cultriform in outline; outer basal lobe a very large, broadly flattened plate, with a further inner constricted arm; surface of outer

basal lobe with numerous long pale setae. Eighth sternite with the two lateral semidetached lobes densely set with short compact setae; although this region of the unique type (mounted on a slide) is more or less damaged, there does not appear to be any median brush of setae, as in most other members of the group.

Habitat. California (Nevada Co.).

Holotype. ♂, Nevada City, June 13, 1939 (Mont Cazier). *Allotopotype.* ♀. *Paratopotype.* 1 ♀; all mounted on a single pin.

This interesting fly is readily told from all related species by the structure of the male hypopygium. In the unusually heavy praescutual stripes, the fly is most like *coronado* Alexander but the hypopygium is entirely different. This latter structure is perhaps most similar to that of *micheneri* n. sp., especially as regards the tergite, but all details of the horn of the basistyle and the inner dististyle are entirely different in the two flies.

Tipula (Lunatipula) supplicata n. sp.

Belongs to the *streptocera* group; general coloration obscure yellow, the mesonotal praescutum with three black stripes, their surface subopaque by a thin grayish pruinosity; tips of femora only weakly infuscated; male hypopygium with the tergite of peculiar shape, the ventral plates appearing as narrowly separated flattened blades, their tips obtusely rounded, each produced into an arm that is directed laterad and caudad to lie outside the tergal plates; horn of basistyle relatively short, dilated on basal third; inner dististyle unusually compact, beak short but slender; posterior lobe small, obtusely rounded; eighth sternite with the median group of setae reduced to about four.

Male. Length about 12 mm.; wing 12-12.5 mm.; antenna about 3.2 mm.

Female. Length about 12 mm.; wing 12-12.5 mm.

Frontal prolongation of head polished brownish yellow; nasus distinct; palpi black. Antennae relatively short; basal three segments yellow; succeeding segments dark brown. Head black, sparsely pruinose, more heavily so in front.

Pronotum brown to brownish black. Mesonotal praescutum obscure yellow, with three black stripes, the median one more or less divided by a capillary reddish median vitta; surface of notum subopaque because of a thin grayish pruinosity; posterior sclerites of notum yellow, the scutal lobes with black central areas. Pleura yellow. Halteres with stem obscure yellow, knob brownish black. Legs with coxae and trochanters yellow; femora obscure yellow, the tips narrowly and rather weakly infuscated; tibiae and basitarsi obscure yellow, the tips very narrowly darkened; remainder of tarsi brownish black to black. Wings with the ground color whitish subhyaline, especially beyond the cord; centers of cells beyond cord with pale brown central areas, as common in the group; stigma and a small spot at origin of *Rs* medium brown; prearcular and costal fields yellow; veins brown, more brightened in the flavous fields. Macrotrichia of cells very reduced in number, with only one or two in cell R_3 and about four in cell R_5. Venation: *Rs* exceeding three times *m-cu*.

Abdominal tergites obscure yellow, the more proximal segments with a nearly continuous median black vitta and isloated black sublateral spots on segments two or six, inclusive; sternites yellow; hypopygium chestnut yellow. Male hypopygium with the ninth tergite of peculiar conformation, the dorsal plates small, with very obtuse apices; ventral plates appearing as narrowly separated flattened blades with obtusely rounded tips, their outer margins produced as slender arms that are directed laterad and thence nearly caudad, their tips obtuse. Horn of basistyle relatively short, only about one-third longer than the dististyle, its basal third much dilated, thence gradually narrowed to an acute point. Outer dististyle a small oval dusky lobe. Inner dististyle unusually compact, nearly parallel-sided, the beak very short but relatively slender; posterior lobe of main body small, obtusely rounded, provided with unusually long,

coarse setae that are directed laterad; outer basal lobe of style a relatively small, narrow, glabrous blade, its tip obtuse. Eighth sternite with the usual paired, semidetached lateral lobes with abundant, conspicuously branched or fimbriated setae; median group of setae reduced to four, these similarly fimbriated.

Habitat. California (Riverside Co.)

Holotype. ♂, San Jacinto River Canyon, May 1939 (T. H. G. Aitken). *Allotopotype.* ♀, pinned with type. *Paratopotype.* 1 ♀, pinned with type; *paratypes.* 2 ♂ ♂, Idyllwild, May 14, 1939 (T. H. G. Aitken).

This fly is entirely distinct from the previously described forms, differing especially in the structure of the male hypopygium, as the ninth tergite, horn of the basistyle, inner dististyle, and eighth sternite. In some regards it suggests *opisthocera* Dietz but the hypopygial structures are entirely distinct. The blackened praescutal stripes suggest some species that are otherwise not very closely related, as *contortrix* n. sp., and *coronado* Alexander. The specific name is an allusion to the elevated lateral arms of the ninth tergite of the male hypopygium.

Tipula (Lunatipula) downesi n. sp.

General coloration of mesonotum dark gray, the praescutum with four relatively inconspicuous grayish brown stripes, the intermediate pair widely separated; antennae with scape and pedicel yellow, flagellum with segments dark brown, their bases blackened; femora with tips narrowly blackened; wings grayish brown, with a restricted brown pattern and conspicuous white obliterative areas, including prestigmal and poststigmal markings; male hypopygium with the inner dististyle profoundly divided into two slender arms, the outer basal lobe provided with blackened spinous points; eighth sternite sheathing, at apex dilated into two divergent flaplike lobes, their margins fringed with long conspicuous setae; ovipositor with base of cerci dilated into a circular saucer-like structure, hypovalvae acutely pointed at tips.

Male. Length about 14.5-15 mm.; wing 16.5-17 mm.; antenna about 5.8-6 mm.

Female. Length about 18 mm.; wing 18 mm.

Frontal prolongation of head brownish yellow, restrictedly pruinose above; palpi with proximal two segments brownish yellow, the outer ones passing into brownish black. Antennae (male) relatively elongate, as shown by the measurements; scape and pedicel yellow; succeeding segments dark brown, with more blackened basal enlargements; flagellar segments feebly incised, verticils shorter than the segments. In female, antennae shorter and more simple in construction, as usual in the genus. Head gray, clearer in front and on orbits, more brownish gray behind; a narrow but evident dusky capillary median vitta; vertical tubercle very reduced.

Pronotum light gray, vaguely patterned with darker. Mesonotum dark gray, the praescutum with four relatively inconspicuous grayish brown stripes, these narrow and entire; intermediate stripes separated by a ground vitta that is only a little narrower than the stripes themselves; posterior sclerites of notum gray, patterned with darker, including the scutal lobes and on either side of base of scutellum. Pleura gray. Halteres with stem dusky, its base narrowly yellow; knob brownish black. Legs with coxae light gray; trochanters yellow; femora yellow, the tips narrowly and rather inconspicuously blackened, the amount subequal on all legs; tibiae and basitarsi yellowish brown, the tips vaguely darker; remainder of tarsi black; claws (male) toothed. Wings grayish brown, very restrictedly patterned with brown and white; prearcular and costal fields slightly more yellow; the dark areas include the oval dark brown stigma and slightly paler brown clouds at origin of *Rs* and along the cord, more extensive over the anterior cord; white obliterative areas conspicuous against the ground, extending from before the stigma into the base of cell M_2; a poststigmal white area; veins

brown, slightly more brightened in the costal and prearcular fields. Venation: R_1+_2 entire; *Rs* a little more than twice *m-cu;* petiole of cell M_1, a little longer than *m*.

Abdomen with the tergites obscure yellow, trivittate with dark brown, the median stripe more conspicuous and more nearly continuous, interrupted by pale caudal rings on the second and third segments; sublateral stripes subobsolete, a little more evident at the cephalic portion of sclerite; lateral borders broadly pale; sternites obscure yellow, the more proximal segments narrowly more darkened basally; hypopygium chestnut-brown. Male hypopygium with the ninth tergite entirely separate from the sternite. Ninth tergite posteriorly with a broad V-shaped median notch, the sublateral lobes thus formed obtuse, provided with abundant setae that become shorter at apex of lobe, such setae being subtended by small triangular points to produce a roughened appearance; posterior lateral border of tergite further produced into a smaller acute lobe that is separated from the sublateral lobes by a more rounded notch; mid-dorsal and posterior portions of tergite more membranous than the portions at and immediately behind the lobes. Ninth sternite with the lobes small, oval, densely tufted with long, crinkly, yellow setae. Basistyle entirely cut off from sternite by a suture; narrow, not produced apically. Outer dististyle long and slender but entirely pale and inconspicuous. Inner dististyle of very peculiar conformation, both the main body and the outer basal lobe being long and narrow; beak obtuse and not blackened or otherwise differentiated in color from the posterior portion of this lobe, provided with coarse erect setae; outer basal lobe narrow, at apex bearing two divergent, slender, heavily blackened lobes and an additional blackened rod that is shallowly split at apex into two points; sensory area at point of juncture of the lobes, semilunate in outline, with numerous pits; main body of style with a broad flattened flange that involves about the outer half of style. Gonapophyses heavily sclerotized, slender, at apex produced into a long, narrow apical spine and a subapical, shorter and stouter one. Eighth sternite sheathing, elongate, narrowed outwardly, at apex again expanded into two divergent flap-like lobes that are separated by a very wide V-shaped incision; posterior margin of lobes fringed with very long reddish setae. Ovipositor of peculiar conformation. Dorsal shield short and polished; cerci at their bases expanded into semicircular, cuplike structures, the actual blades arising from the lower and inner margin of the circular orifice; blades of cerci flattened, lying obliquely to almost transversely, their tips obtuse; hypovalvae very thin and membranous, compressed-flattened, their tips produced into small acute points.

Habitat. California.

Holotype. ♂, Mirror Lake, Yosemite, altitude 4,000 feet, June 6, 1939 (A. Downes). *Allotopotype.* ♀. *Paratopotype.* 1 ♂.

I take great pleasure in naming this species for the collector, who captured and sent to me numerous crane-flies from various parts of California, particularly the Yosemite National Park. The fly is very different from all other described members of the subgenus, especially in the very peculiar ovipositor and hypopygium, more particularly the inner dististyle and eighth sternite of the male and the cerci of the female. No other species known to me can be compared profitably with this fly.

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